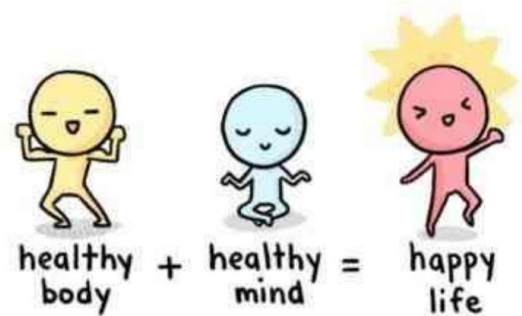




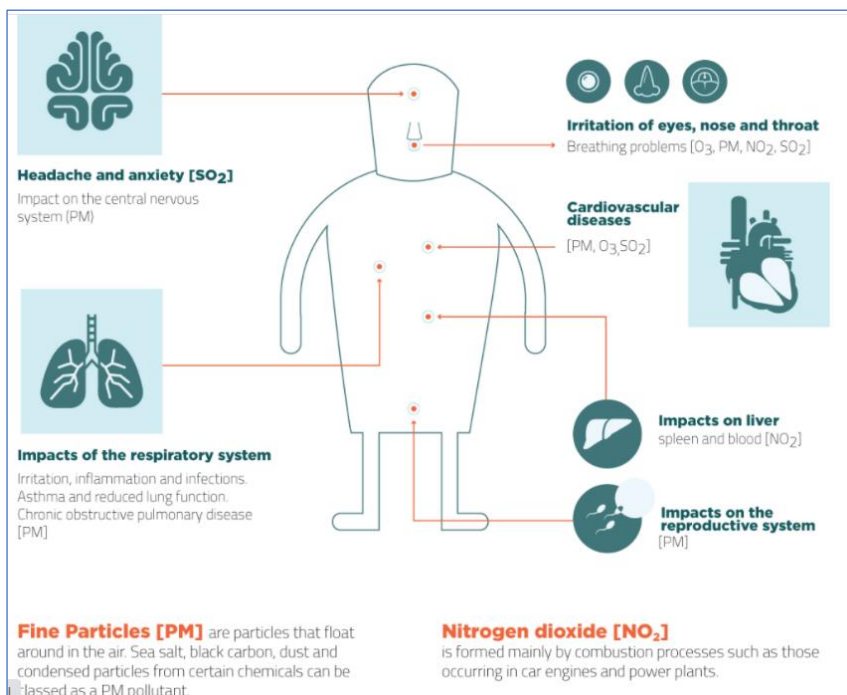
## THE GLOBE PROGRAM

### Air Pollution – Health & Environment Impacts

The European Environment Agency has identified air pollution as the single largest environmental health hazard in Europe, accounting for over 1,180 premature deaths each year in Ireland <https://www.eea.europa.eu/themes/air/health-impacts-of-air-pollution>. Traffic-related air pollution is one of the principal causes of poor air quality in urban areas in Ireland (EPA report).



Air pollution has a big impact on our health and the environment around us. According to the European Environmental Agency air pollution is a major cause of **premature death** and **disease** and is the single largest **environmental health risk** in Europe. Heart disease and stroke are the most common reasons for premature death attributable to air pollution, followed by lung diseases and lung cancer.



This image highlights the main pollutants of concern and the associated effects on our bodies.

Image from an educational resource developed by the Scottish EPA, which can be found [here](#).

## Who is affected by air pollution?

Some population groups are more affected by air pollution than others, because they are more exposed or vulnerable to environmental hazards.

- Lower socio-economic groups tend to be more exposed to air pollution
- Older people
- Children
- Those with pre-existing health conditions are more vulnerable

Who should protect those who are more vulnerable? How do we reduce air pollution as a community?

## How does air pollution effect our environment?

Poor air quality not only harms our health, it can also harm the environment. The main adverse effects are acid rain, nutrient enrichment, and the greenhouse gas effect.

### 1. Acid Rain

Acid rain is defined as any form of precipitation where the **pH is less than 5.6**. Some pollutants such as nitrogen dioxide and sulphur dioxide can become acidic.

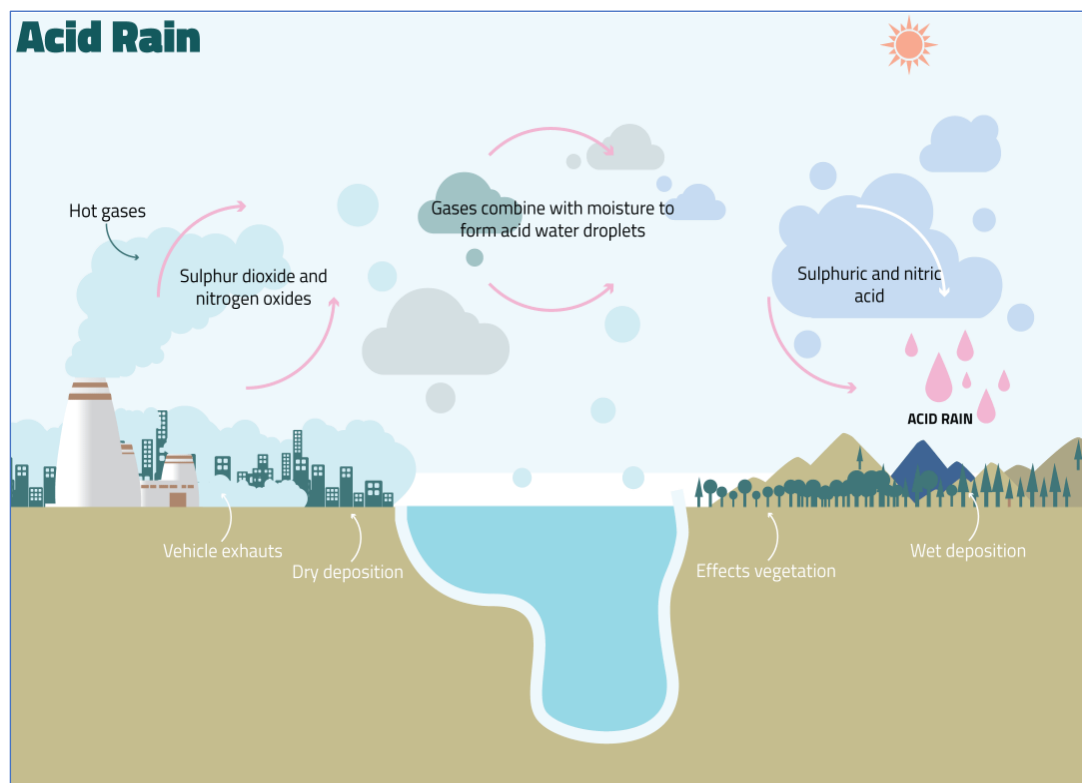
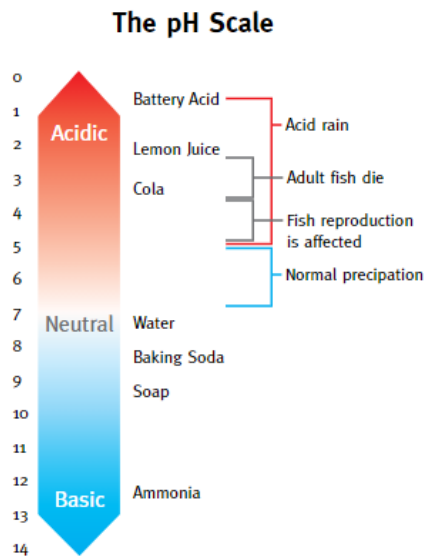


Image from an educational resource developed by the Scottish EPA, which can be found [here](#).



Acid rain occurs when acidic components, such as **SO<sub>2</sub> and NO<sub>x</sub>** react with oxygen and other chemicals to form sulfuric and nitric acids. These then mix with water and other materials before falling to the ground as **acid rain**.

The major sources of man-made SO<sub>2</sub> and NO<sub>x</sub> in the atmosphere are:

- Burning of fossil fuels to generate electricity
- Transport vehicles and heavy equipment
- Manufacturing, oil refineries
- Agricultural emissions

When acid deposition is washed into lakes and streams, it can cause some water bodies to turn acidic, which has a **negative effect on aquatic ecosystem health**, particularly fish.

## 2. Nutrient Enrichment

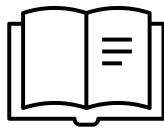
Nutrient enrichment is when there is **too much nutrient** (nitrogen, potassium, phosphorus) available to organisms. Air pollutants, such as nitrogen dioxide, can transfer to the Earth's surface and accumulate in the soil and water through time. This changes the nutrient balance in the habitat, there is simply too much nutrient available which leads to one or two organisms 'overgrowing' and using up all valuable resources. This is termed eutrophication.



[Image from greennews.ie](http://greennews.ie)

As a result, the amount of oxygen can drop significantly, and sunlight can be blocked which effects the whole ecosystem health leading to a drop in biodiversity and habitat loss.

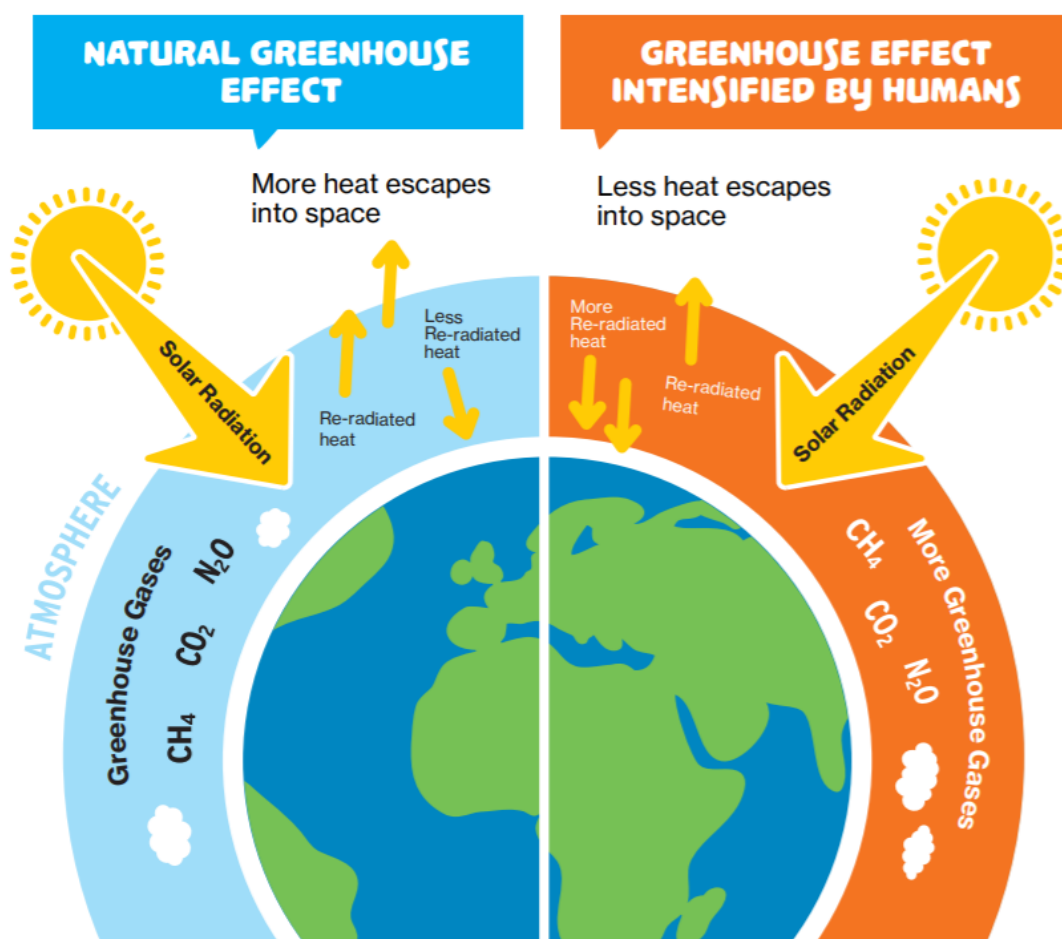
This image shows algae overgrowth in a water body in Ireland. This is an example of too many nutrients entering the water, resulting in eutrophication.



Read the following [article in the Irish Times](#) about pollution in Ireland's waterways.

### 3. Greenhouse Gas Effect

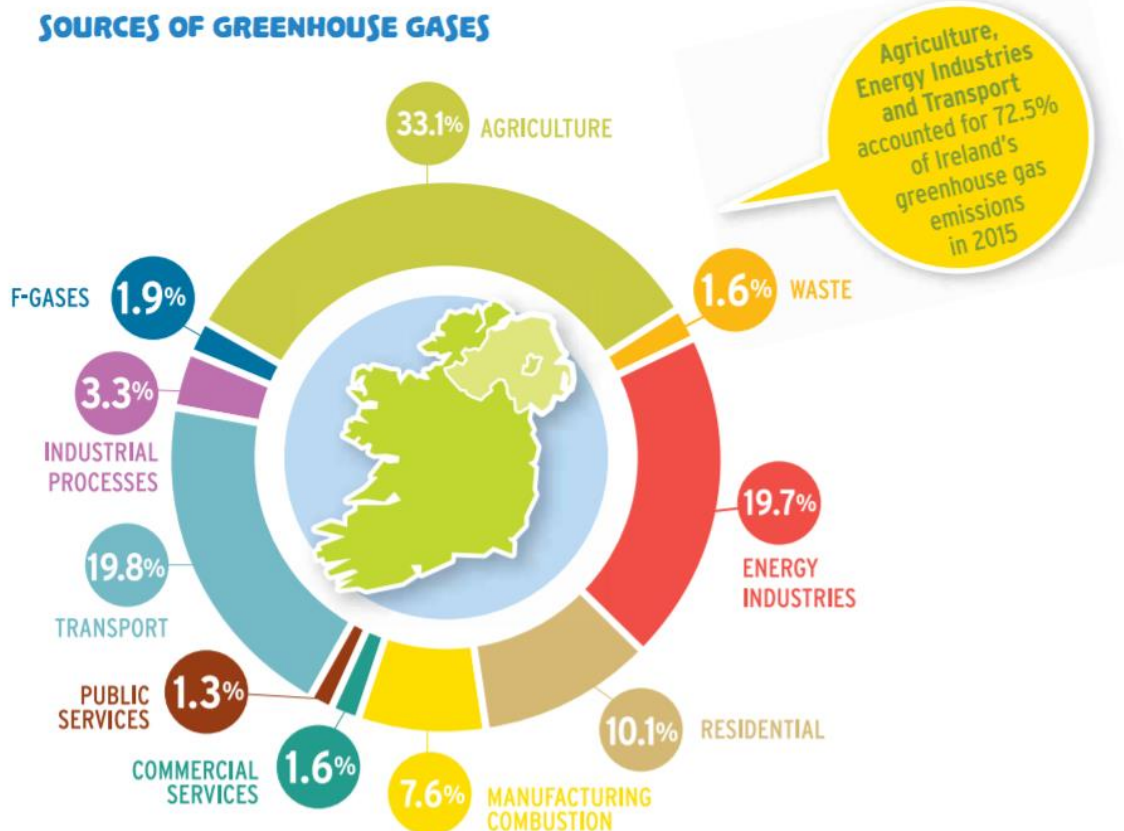
Water Vapour (H<sub>2</sub>O), Carbon Dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>) and Nitrogen Dioxide (NO<sub>2</sub>) are all greenhouse gases. A greenhouse gas is any gas that has the property of absorbing infrared radiation (heat) and therefore reduces heat loss to space. On Earth, we rely on these greenhouse gases to keep the surface temperature suitable for life. However, too much greenhouse gases in the air intensifies this process and causes the atmosphere to heat up.



Carbon dioxide (CO<sub>2</sub>) levels and other [greenhouse gases in the atmosphere](#) rose to new records in 2019. We are now experiencing **Climate Change**. Climate change is affecting

every country on every continent. It is disrupting national economies and affecting lives. Weather patterns are changing, sea levels are rising, and weather events are becoming more extreme.

The main sources of greenhouse gases in Ireland are Agriculture, Energy Industries and Transport (EPA source)



Source: [www.epa.ie/media/infographic\\_climate\\_July2017.pdf](http://www.epa.ie/media/infographic_climate_July2017.pdf)